

THE STORY OF SOVIET ARMOR

PART IV - THE WAR YEARS - THE TANK

by GARRETT UNDERHILL

WHEN the German juggernaut was launched against Russia, the bulk of Soviet armor as yet was made up of the older models of the 1930s—the fast BT's and the slow T-26's with their 45mm guns, and the T-28 mediums. The little two-man T-27's originated as "machine gun carriers" by the British show up to the West only in beleaguered Leningrad, where anything went. The 3.86-ton tinplate T-37 and T-38 amphibians seem largely to have been withdrawn from infantry units, the integral infantry accompanying tank role apparently being taken over by the 10½-ton T-26's. (After the war, T-38's have appeared as logging tractors and chassis for logging cranes—indicating that even Russian tanks get sent to Siberia.) But there were one or more thousand of the new series heavy and medium tanks, in the creation of

Second of two sections devoted to The Tank in the portion of *The Story of Soviet Armor* covering The War Years.

which Stalin played a stellar role. Considering their relative superiority (on paper), and the fact that they came as a surprise to the Germans—it was in the cards for them to have a stellar if not decisive role, too.

They didn't; and if they gained in importance, it was because the campaigns of the first summer and winter practically eliminated the older tanks. Of these, only the T-28 medium (with short 76mm gun) distinguished itself at all—though not sufficiently for the Germans to make mention of it. The extra-armored versions of

the T-28's, resulting from Finnish War lessons, were a surprise. But not such as to affect the course of an action.

German technical comments on captured specimens of these tanks interestingly reveal that, despite the fact that basic engineering designs of the 1930s tanks were borrowed from experienced foreign firms, the tanks tended to have the same mechanical deficiencies as the previous two waves of Soviet tanks: the original Russian Renaults of the 1920's, and the experimental Soviet tanks of the 1920's. They were rough running, cranky, and generally poor as regards steering and transmission. The fast BT types were singled out by the Germans for poor transmission.

Even the new series tanks—the KV and T-34 as built under semi-peace-time conditions (for the Soviet arma-

ment industry has always been in a flap about increasing production such as most industries get into only in war)—were deficient mechanically. The power train in general was troublesome, and as has been noted for the T-34—the transmission in particular. Gears showed greater wear, indicating that demands for quantity production at an early date had forced plant engineering staffs to accept watered-down material which derived from technical and skilled labor staffs too quickly watered-down themselves, in order to provide cadres for new plant capacity.

In peacetime these deficiencies were to all appearances overcome by personnel training in field forces. Indeed, during the war Soviet officers of the Tank Engineering Service (the special ordnance division which both designs, manufactures and maintains armor in the field) said that quality was often consciously compromised, and special gadgetry omitted, because it took less man-hours to train tankers to make up for mechanical deficiencies or defects than to try and correct them with machines and skilled labor. Of course, the Soviet officers were arguing (to some minds quite rightly) that we put more industrial effort into weapons than realistic war economics warranted.

Nevertheless, the Russian theory is one of those superficially-sound and seemingly common-sensical Russian rationalizations which doesn't necessarily hold up so well on analysis. It could well be argued that, because the average Russian recruit is a mechanical ignoramus and because needs of expanded war production call for whatever skilled labor there is, the tanks should be pretty foolproof and able to last without constant thorough checks and maintenance. As it was during the war, the Soviets required the US 50-hour types check every 25 hours, and the US 100-hour check every 50 hours. The recovery and field maintenance organizations increased in size six times during the war. Prior to the war 48% of the repairs were factory jobs, and during the war 92% of work was done in the field. Field maintenance units got to be so complex and thorough that they even had electric furnaces for repairing armor of heavy tanks. German authorities have generally praised the Soviet tank maintenance men, and

We are hearing from all sides about Soviet Russia's Joseph Stalin tank. What about the ideas back of them, the men who man them, the tactics and strategy that fight them? In comparing American with Soviet armor, Mr. Underhill suggests that we think of missions as well as quantity and quality. "In war as in sport, it's the team that counts—and not the apparent stars."

found them so well skilled as to be desirable recruits for German maintenance units.

Before the war, when the Red armored force and other troops were exhibited to the West at the Minsk maneuvers of 1936, the now Marshal Lord Wavell and the tank pioneer Gen. Sir Giffard Martel both noted how well the Russian tanks stood up. During the exercises there were hardly any breakdowns. The concluding review was climaxed by a parade of 1,000 tanks without a single breakdown—a feat which both British generals asserted could not have been duplicated by any other forces in the world. (Two years later Germany was to draw ridicule because of panzer breakdowns in the forces occupying Vienna—failures which some Germans claimed to be normal for conditions encountered.)

But those who know the Russians well can only conclude that such an exhibition only proves that the Russians can do a good job, if they want. Or rather, if their command holds them to the line. If the military history of Russia proves anything, it is that maintenance of efficiency (and particularly mechanical efficiency) is more a function of smart and stern command, than in any other army. People viewing a given Russian unit never know whether they are seeing the real Russian military—or a special show for which an unnatural effort is made. In the opinion of some of the Minsk maneuver observers, the way the tanks stood up was "too good to be true"—a phrase used since the war by foreign military men who have viewed the Red Square parades. For, as Maj. Gen. Sir Richard Hilton (British attaché in Moscow in 1947-48) remarked, it must always be borne in mind that the Russians, and especially the Soviets, are "past

masters in window-dressing and propaganda."

Obviously, a considerable proportion of the wartime repairs were done in the factory: rail transport had too much else to do. A moot point is whether the field forces didn't build up large facilities capable of major overhauls, because the wartime tank industry—right under the thumb of Molotov himself—was striving to produce ever more tanks, while at the same time cutting down man-hours and using less and less in the way of critical materials. Wartime economic czar Voznesenski after the war proudly told how between 1941 and 1943 factory time on a T-34 was cut from 8 to 3.7 thousand man-hours; how that for a KV went down from 14.6 to 7.2. The ersatz-ation of metals admitted is remarkable. And it's important to note that materials substitutions seem in no small part to have been required by the quantity of all arms built. True, the loss of the manganese sources in the South (recovered in '43) was serious for armor both plate and cast. Still, any effort to arm over 500 divisions, build 30,000* armored vehicles a year (the US built 86,000 tanks during the war), 40,000 planes annually, and have extra pools of artillery, mortars, and armor—would represent quite an immense effort for any country. For one with Russia's industrial rating (granted that her industry was built for heavy armament work), such quantity production inevitably demanded tremendous qualitative compromises. The reduction in the quality of armor itself—of plate and castings—is covered up in Voznesenski's boasts by assertions that making armor steel by the special "duplex" process, instead

*1943-44-45 average.



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of in open hearth furnaces, saved 350,000 tons of steel. But the quality of Russian armor steel was such as to enable Hitler and his sycophantic cronies to hold onto their vain hope that Russia was on the verge of collapse even after Stalingrad.

How over-fascinated the Russian leaders were with quantity is only too well illustrated by the fact that, when they were seeking to get peak armor production and were getting it, they alone were outproducing Germany at least two times.

How quality suffered both from pre-hostilities feverishly speeded-up armament programs, and from multi-digit wartime quantitative goals, is well illustrated by the fact that tank-poor Germany conspicuously failed to use captured Russian tanks—however highly they praised the build of the T-34 and KV, and their paper characteristics. The Germans took over the thousands of Russian field and antitank artillery pieces they captured in '41 (there were two schools in France specializing in training on Russian artillery at Normandy time). They even modified Russian antiaircraft pieces to take standard German 88mm ammunition. But they didn't bother to refit Russian tanks for use in the West, or to police Balkan partisans—the way they used French tanks. And they certainly never incorporated them in their own panzer divisions, the way they did Czech tanks.

The conclusion is inescapable: in things automotive—in mass manufacture to close tolerances of fast-moving parts which must last, the Russians had not made the grade, despite going right to Detroit to learn how. And they had been trying the American way for ten years when attacked.

Significantly, with aviation engines it was the same—only more obviously so. Even today experienced designers like Klimov, Shvetsov, and Mikulin adapt proven foreign designs to Russian industrial conditions. It is said by Russian engineering refugees that they are afraid to try out their own ideas, lest production schedules be held up for a year or more while the "bugs" are ironed out. If so—and so it appears from evidence—the parallel with tanks is close. It was this matter of time and bugs which made Soviet tankers turn to foreign tank designs for the tank wave of the 1930's. Even



Alexander A. Mikulin, designer of Soviet aircraft engines. Engines are important to armored personnel.

so, the ever-expanding Russian aircraft engine factories (Germany's Gen. Ernst Udet and his technical staff, shown the Kuybishev combine in May of '41, estimated that its capacity exceeded that of all six major German engine combines then extant) have never been able to guarantee aircraft engine reliability—unless the engines are hand-tailored. Russian fighter pilots in the Balkans after the war used to refer to their planes as "coffins with music": chances of engine failure on take-off were such that they were likely to end up with the coffin and military music which in the Soviet forces are accorded a man who dies in line of duty. That old Tsuapolev's copy of the B-29, produced in 1947, mounts copies of Wright Duplex Cyclones (which rate in America at 2,200 HP)—when US B-50s produced contemporaneously are fitted with 3,500 HP Pratt & Whitney engines—is meaningful to US tankers as well as to airmen. The long-range strategic employment of armor as well as aviation—and its continuous use at critical periods—depends, a great deal upon internal combustion engine reliability.

Whereas Germany made efforts to improve armor during the war by building new types of tanks, the

Soviets had the sense to make their improvements largely within the framework of what they were building.

Besides the tanks mentioned, the new series was to include a replacement for the T-26 light (as the KV heavy replaced the T-35, the T-34 the BT, and the amphibious T-40 the T-38). This was the T-50, of around ten tons. It mounted a 45mm gun turret well forward. A manual was issued on it in 1941, but the Germans never reported it in service. The Soviets acknowledge it was a failure. Around 1940 the Soviets were trying an experimental T-30, which is not further identified.

The Soviets, then, were not themselves aware of what they'd done in creating the T-34 and KV. Tactically and strategically, their thinking as to armor didn't change when the new series came in. Stalin in late July of 1941 himself still put more faith in infantry-support tanks, than in panzer divisions. He then told Harry Hopkins that the Germans were at last recognizing the error of their panzer ways, and assigning more and more tanks from panzer divisions to infantry support work! The 76mm guns had been fitted to Russian mediums and heavies for years; in the new tanks they'd just been made more powerful.

In the BT-8, the Soviets had had a Christie with 500 HP and a 76. The T-50 was to carry on for the T-26 light, and the T-40 for the T-38. In a reapportionment of missions, the new KV heavies took over the work of both the T-28 mediums and T-35 heavy breakthrough tanks. The T-34 could, like the BT, both assault and work in the Red Army's "pocket armored divisions" for long-range armored work—the moto-mechanized corps.

The Soviets therefore continued to search for a replacement for the T-26 after the war started. But before it was introduced, they made an effort to salvage the T-40 as a non-amphibious T-60. It kept the weight—5½ tons—but by shedding armored flotation tanks was able to increase armor to 8-in., though the side armor was only 23-in. The front, side, and rear were modified, and coaxially with the rifle-caliber DT machine gun there was put a 20mm aircraft Schvak cannon (for the 12.7mm gun). The speed was about the same. The tank was in the light and little group which the Soviets designed to use auto components, and was made in the Moscow area. It began to show up late in 1941, but was soon abandoned as too thinly armored, even for reconnaissance. The crew was two.

The short-lived T-70 appeared the next year. It, too, was in the auto-components class and was put out by the big Gorki plant—too far East of Moscow ever to be in danger. It used two coupled in-line liquid cooled auto engines. On a weight of about

10 tons (similar to the last T-26's) it made 28 mph. The welded plate armor on the hull was 14-in. thick in front, 6 on the side. The armor on the welded plate turret was all of 2.3-in. in front, with 1.37-in. on the side. The turret mounted a 45mm gun and a coaxial DT. The single sloping front plate of the hull carried no ball-mounted DT, though it was pierced for a driver's hatch and a transmission servicing hatch. It was definitely a production design, adapted to existing tooling—as opposed to the more specialized designs of the big tanks like the KV and T-34. That is one reason why it did not have the usual Soviet-approved rear-drive. When it proved too light in gun-power and armor for a combat recon tank and was abandoned in 1944, this engine-in-front adapted the chassis for conversion into the form of a German-type self-propelled gun. The crew of only two hardly sufficed to carry out duties of driving, observation, fire, and communication required in a recon vehicle—but the Soviet even in 1942 stuck to two—as usual for them in light tanks intended for such purposes. By the time it was developed, it was no longer really a replacement for the three-man T-26, for a two-man tank with such armor and armament could hardly presume any infantry support roles.

The Soviets mention a T-80 light tank in this class, but never standardized it. They simply gave up their effort to get a light tank to do their recon. The old BA-10 no-reverse-gear six-wheeler Gorki Ford armored cars

did the job, aided by new BA-64's. These were on four-wheeler Ford chassis out of Gorki. Their very light armor was shaped like that of the light German Horch cars—angular. The hull was topped by a sort of opened-top rotating turret of the Horch type, which mounted a DT tank gun and could protect the gunner if he crouched down. Like the BA-10, it did not have front-axle drive, which must have been embarrassing in Russian mud and Eastern Europe's generally poor roads.

The Russians got, via Lend-Lease, 4,000-odd M3 open-topped scout cars for recon. The Russians are as silent as the tomb as to whether these or the 1,600-odd M3 lights (which began to arrive in action just before Stalingrad) were better. (They got only a few samples of M5 lights.) They got 1,200-odd half tracks, which appear to have been used for command and recon purposes (like the scout cars) rather than as personnel carriers. The Russians got some of the little British Tetrarch tanks too.

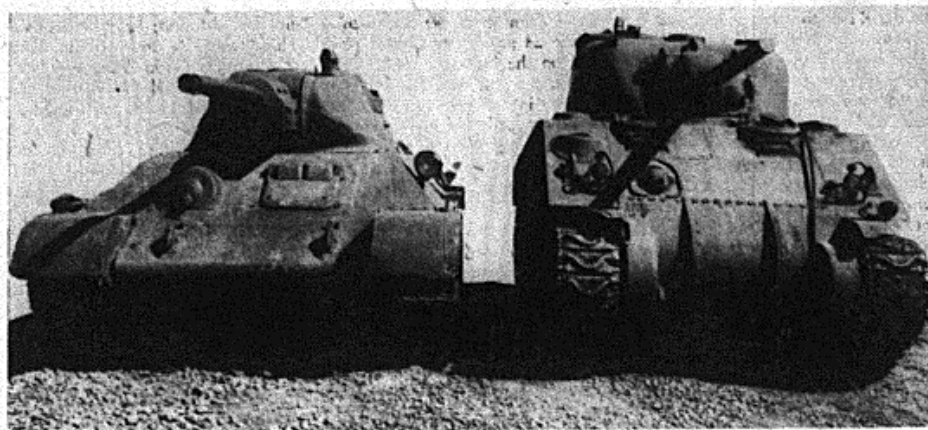
Thus they never had, throughout the war, a proper modern service reconnaissance vehicle—armored car, or tank. The M4 Shermans, considered by the Russians weakly armed by the time they arrived in numbers, seem to have rated as good strategic recon vehicles—particularly because of their mechanical reliability. They could keep going, even if they couldn't shoot it out. They got somewhat over 4,000 Shermans, slightly over half of them with the 76mm gun.

The British, when the Germans attacked, at once sent Valentine infantry tanks from Canada, and the earlier Matildas from England. They also sent some bigger Churchill heavy tanks at this time, when Stalin was uncertain whether he'd be able to move his main Kirov (Leningrad), Kharkov, and Stalingrad processing and assembly plants—with all the sub-contracting plants connected with them.* To the end of '42—till America could get going, England sent all of 2,600 tanks (number which arrived not here reckoned). (After that England was on the receiving end of Lend-Lease tanks, getting over four

*For a month or so after the German attack—which he hoped to hold West of the Dnepr River—Stalin didn't think he'd need—tanks from the West.



Assembly of V-2 Diesels at the Kirov Diesel Plant.



Front view of Russian Medium T-34 and U.S. Medium M4A4 tank.

U.S. Army

times the number of M4 Shermans that Russia did—and almost four times the number of M4 Shermans that Russia did—and almost four times the number of tanks in the overall.)

By Russian standards even of 1941, these British tanks were undergunned. The Valentine and the better armored Matildas had a 47mm gun, while the best the Churchill had was a 57mm. The Russians spoke of them as being "common graves," and from the Russian point of view could hardly vie with the 52-ton KV's in infantry support. Some were noted as late as 1944 waddling along astern of the monster SU 152 self-propelled guns, acting as escort tanks (one per gun) to fend off tank-hunter teams of hand-picked German daredevils.

The Russians reserved their hardest words for our M3 Medium the British called the Grant. Four-star tank General Mikhail D. Solomatn has meanly remarked:

"Frankly, I cannot conceive of what induced the Americans to build the nonsensical machine General Grant with three levels of guns. . . . Not without cause our tankists named the general Grant 'incinerator for 7 persons.'"

American correspondents, particularly Leland Stowe, noted that these opinions weren't just voiced by officials on their normal bent of running down foreigners. They also came from the troops, who—being less GI—tended to substitute "brothers" for "persons." As a matter of fact, the

1,300-odd Grants sent soon seem to have been relegated to trainers for Sherman crews, and maintenance men.

Solomatn, in this 1947 summary of tank development, has equally hard words for the M4 Sherman medium, which—he says—was "simply good for nothing" along with the Grant. He and the other Soviet tankers who took and take such a stand show short memories and little tolerance. The Red Army model for the original KV design competition rated as a mobile version of Governors Island's Castle William. The early KV's and T-34s had 76's less powerful than the Sherman or Grant's 75's. Possibly the Russians became miffed because, when beginning in 1941 they tried to tell us what tanks for World War II should be like, our people gave them what certainly appeared to be the brushoff. We wouldn't learn from our Russian "friends" or German enemies. We built tanks to equal what our enemies potential had at the time characteristics were approved—not what they had under development. Despite talk, America did not seek to build a better tank than the enemy would have, when the new tank made its debut.

The Soviet Army did, though during the war it temporarily lost its lead—at least on paper. In 1943 it re-armed and re-turreted the KV heavy tank to take a M1943 tank version of the M1939 85mm anti-aircraft gun

—the Russian counterpart of the German 88. (Since all Red Army artillery was under one arm, and not divided into Field and Coast Artillery like ours, Red artillery authorities had been overjoyed to adapt their flak to antitank fire. The 85 had proven itself in the first campaigns.) This KV 85 had a cast turret with commander's cupola—an item copied from the German Pz. Kpfw. III's and IV's, but attributed to Stalin by all postwar Soviet historians. Though the chassis was the ordinary KV type, the tank was slightly higher (9 ft.). The Germans reported the hull armor on sides and rear as somewhat lighter than the ordinary KV's—between 2.34 and 2.54-in.

Since the KV 85 appeared at the beginning of the era when the Russians assumed the offensive and the Germans found difficulty recovering such matériel, their reports are not to be taken as certain. It is doubtful if the KV 85 was made in any great quantity, for in 1942 and 1943 Urals plans were striving to turn out self-propelled guns on KV chassis. In 1943 the evacuated Kirov plant in the Urals was changing over the Joseph Stalins.

By the time the KV 85 was coming into service in the Spring of 1943, the Germans had the better-armed and faster Tiger for a breakthrough heavy tank. The German super-T-34, the Panther, which came into service later in 1943, at 50 tons came close to the weight of the KV's; it had far

better speed, good transmission and steering for quick handling. Its super-velocity 75 of 70 calibers made a better tank vs. tank gun than the Russian 85 of 51.5 calibers length. (Though the anti-aircraft Russian 85 had a Bofors-type muzzle-brake—being patterned after Bofors designs, the tank 85 does not.)

True, the Panther didn't exist in great quantity even at the end. But in design it surpassed the slightly revised T-34s that came out in 1942 as the evacuated tank factories of Leningrad (Kirov), Stalingrad, and Kharkov set up in business again in the Urals. Tank factories at Sverdlosk and Nizhni Tagil had been on T-34s anyway; the others started anew on the T-34 when their combined center (including the Kharkov diesel engine works), set up in what came to be known as "Tankograd," got the T-34 blueprints late in July of 1942. Re-tooling with 400 new dies and some 5,000 tools and jigs was completed so as to rush out the following August 22d this new combine's first T-34—named after (you'd never guess it) Stalin. The Stalingrad plant kept working till August, 1942, when evacuation began. (Lots of its tools never got out of the plant or railway yards at Stalingrad—but despite the siege remained in shape to handle major tank repairs when operated by the skilled field maintenance men.)

Before the Tankograd combine cut in, the T-34 for 1942 had a hexagonal cast turret which eliminated that nasty rear overhang. In at least some factories' output, pistol ports were abandoned, and the number of periscopes cut to one—while the driver got a double episcopes on the upper edge of his door in the front hull plate. The new turret had thicker armor (2.34- to 2.7-in.). (After the war began, some of the original T-34s had their front hull armor beefed up by welded-on plates 3/5ths of an inch thick; these were small, and gave a waffle-like effect. About the same thickness was added to front and sides of the turret.) The ball mount on the hull DT was redesigned and armored to prevent small arms fire fouling the ball.

In 1943, the commander's cupola was added to the hexagonal cast turret. Again the front roof of the turret sprouted two rotatable periscopes. The side pistol ports (consisting of a vision

slit, with a hole below sealed by a plug on a chain) became standard on all output. At one time, the Tankograd combine turned out a turret with dewlaps on the side, apparently an effort to protect the rather exposed turret ring from being jammed by light AP ammunition.

It is doubtful if, as sometimes reported, the T-34 was ever built without the usual hard-rubber tired bogies. Photos of tire-less T-34s merely indicate that poor crew maintenance resulted in rapid wear of tires on several or all bogies, leaving the track to run on the steel rims. At no time does there appear to have been any trial at using the Christie-type T-34s to run on roads without tracks, nor is there any mention by the Soviets of their having any intention of providing for such runs in the original design.

The apparent technical inferiority of the T-34 and KV 85 tanks in service in 1943 actually mattered little, for Russian improvements had been on basic chassis. No disruption in production resulted, as in the case of the new German tanks. Theoretically, the Russians still had the edge on the Pz. Kpfw. III's and the IV's (the latter with long 75 having become the principal German tank). By sticking to what was essentially standard, the Russians in 1943 had plenty of tanks, just as the West had plenty of Shermans.

But the Soviet authorities weren't

content with the situation; they wanted the most powerful tanks as well as the most. Morosov went to work and redesigned his T-34 to take a long cast turret that would mount the 85mm gun. The 85 M1943 has a muzzle velocity of 2,950-foot seconds with armor-piercing ammunition (according to the Germans). It definitely put the T-34 ahead of the common or garden Pz. Kpfw. IV. But with the big new cast turret (commander's cupola to right, with pistol ports on each side, and ventilator dome on roof rear), the T-34/85 had picked up weight. It now no longer has those characteristics of speed and "passability" which so distinguished the original "light-foot" model. The new model came into service in 1944, and has been the standard medium of the postwar years. It is definitely over-improved for its basic design and engine. And Morosov's basic design was five years old, when he reached for drafting gear to draw up the final improvements.

In 1943 young Kotin (who has a full head of hair) was also striving to get more power and armor on his same old chassis. The fruits of labor of his design team was the first Joseph Stalin, which went into production at the Kirov-in-Urals plant in 1943. This plant then dropped its T-34 assembly-line, and concentrated on the new heavy tanks—which appeared the next Spring in



The Soviet T-40 tank.

Margaret Bourke-White from Life

the Ukraine, to take the Germans by surprise.

In this tank, Kotin's team abandons the KV rectangular-type hull with uniform thickness plate (more fitted for production than for resistance to attack). They go in for ballistic form, including a shaped casting for the front top of the hull. The driver is placed in the front center, and the superstructure fared away either side of him. The sides of the superstructure slope, and the rear plate (with two transmission servicing hatches) slopes toward the front.

The big cast turret fares away toward the front, but it's rather fat at the rear, where a DT machine gun is set in a ball mount on the left. The commander's cupola is also on the

sound like a monster, it's actually small and low—as low, if not lower, than a Sherman. The chassis's width again permits saving on height, though by this time the Soviets felt that the chassis and suspension were due for some minor redesign. Armor on the front was upped to almost 4 inches. The Germans felt that it gained as much as 50% in impenetrability over the KV because of form. Sides of the original were around 3½ inches, with the turret sides close to 4. But Panther guns and late 88's could hold it anywhere at ranges up to 2,200 yards.

The ace in the hole was the new gun—a big, long 17.15-foot 122mm gun, tipped by a German-type double-baffle muzzle-brake. (The 122mm

plate. For the first time in Soviet tanks the front plates (which join in vertical center line, sloping off to the sides sharply) aren't pierced for the driver. He sits with his head almost right under the turret, on a seat that can be raised or lowered as on US tanks. His periscope is in the cover hatch. The rest of the chassis is more or less like the original Stalin's. The other big change is in the cast turret, which has been squashed down and made round, with sides sloping sharply upward and in. At the edges, they actually overhang the superstructure sides. The commander's cupola is dropped. The turret carries the radio, which has a buggy-whip antenna on the left. A 12.7mm DShK machine gun is mounted in



Soviet T-34/85's in assault. Note the infantry in foreground.

Bofoto

left. As on all Soviet tanks, a DT is mounted coaxially with the big gun, but for antiaircraft there is an innovation. A 12.7mm D Sh K is permanently mounted atop the turret in front of the cupola. It can also be used against disorganized personnel when the tank is passing through a breakthrough area, as well as against planes. (T-34s never mounted AA MG's. In one instance reported by an American liberated from a German prison by a T-34 brigade commanded by a woman, crews simply paid no attention when their parked column was gun-strafed by German fighters.) In 1943 Soviet armor began to carry one PPS tommy gun per vehicle—a Russian copy of the German MP 40 Schmeisser, having a similar folding skeleton stock. JS's got one such.

Though the original Stalin may

caliber may be strange to the US, but it's a Russian caliber for 4.8 inches. Guns of such caliber have long been common in Russian field artillery.) A bracket is fitted to the rear of the hull to hold the gun steady for travelling.

After some minor hull modifications, Kotin undertook a complete redesign of the Stalin for production in 1944. His original big Stalins seem to be a little too big and thus too heavy for the basic suspension and horsepower units derived from the KV. The weight was close to that of the big KV-2 when the Stalins were combat loaded, and a drastic redesign was called for if speed and "passability" were not to be sacrificed.

The result was the Joseph Stalin III, which appeared in action in 1945. Troops aptly called it the Pike because of its sharp angled nose of

front of the right turret hatch. There are plenty of hand-holds for the tank-borne troops considered as a necessary escort for heavy tanks.

With this tank, the last redesign in six years of work, Kotin proudly proclaims a genius like Morosov. His acknowledged co-designer of the KV, N.L. Dukhov, doesn't share honors with him this time; instead it is Shashmurin and Rybin who are cut in on the prize. Whoever is really responsible, they enable a claim to be made that the weight of the Soviet "heavy" is back to what the engine and suspension were designed to handle back in 1938-39—50 tons. Kotin proudly writes that his tank scales at a third the weight of the German Royal Tiger—and packages more power. (It also packages the crew like sardines, but then comfort has always ruthlessly been sacrificed

for combat capability in Soviet tanks. The "unnecessary" comfort built into British and American tanks is what Soviet tankers single out first for criticism.)

But all that glistens is not gold—especially in Russia, where it has always been unwise to judge by appearances.

This wonderful tank mounts a gun which should have its ammunition power-rammed—but has no rammer. Its 122mm rounds have to be loaded in shell and cartridge case components, as on the standard wartime US Navy 5-inch 38's. This hardly makes for speed in getting in the first few rounds in one of the main missions the Soviets give a heavy-tank vs. tank fighting. The size of ammunition and gun makes for less ammunition storage capacity.

Why did the Soviets jump from an 85 right to this 122? Why did they not, like the Germans, beef up their heavies' power by a super-velocity 85—for the Germans were very satisfied with their Royal Tiger's Model 1943 88? How come they didn't shift back to the fine 100mm gun, when that became available? Why did they put a 122 in a tank, when in 1943 they were already mounting the long-range 122mm M1931/37 field gun on a well-armed KV chassis?

These questions suggest that wartime Soviet armor cannot be considered without the background of Soviet tactics—for attempts to gage any piece of foreign armor by trying to fit it to one's own concepts, is likely to produce wrong conclusions. Re-

calling Stalin's known direct interference in KV development, in aviation details, and in artillery design, the question is raised as to whether he (like Hitler) was the one who preferred big things better than ones less striking but more efficient. Wartime reduction of tank materials quality suggests that the qualitative reduction of ammunition, consequent upon fantastic quantitative production to meet the needs of gigantic armies and air forces, may have had something to do with the selection of such a big piece over a smaller one. Recollection of how Kotin himself blandly confesses to slipping one over on the Red Army—by "just happening" to have a design that Stalin at once liked—raises the issue of whether bureaucratic intrigue played its role.

What happened when the Germans attacked in 1941 is a strong reminder that there are other factors behind the Soviet military scene, than can be expressed in mere statistics. The statistics-minded should recall that three months after Hitler struck with numerically inferior forces, 11 years of guns-or-better intensive rearmament lay in wreckage. Stalin had lost some 17,500 tanks to Hitler's 550. Plane losses were similar. And as for Stalin's subs, they distinguished themselves as much as their "formidable" (on paper) 1914 undersea fleet had. The sailors on the Baltic tied up their boats in Leningrad without bothering to test the German barrage in the mouth of the Gulf of Finland; they took to the shore and fought that kind of war that Russians know by tra-

dition and fight well—infantry combat. Red tankers, too, would forget that success in war comes from firepower and mobility: they'd dig in their tanks, and fight them as if they were armored cupolas of a Maginot Line.

The important lessons to be drawn from the war years then, must derive not from the quality and quantity of Soviet armor. They must stem from the ideas armor is built to implement—the strategy and tactics. Most important of all are the people. First are the men who have the ideas which govern the quantity-quality balance in material; who determine the ideas and the atmosphere in which they're conceived, and the atmosphere under which the working army is trained. Hardly less important are the men who man and command the tanks themselves.

Thus folk who seek to compare the Stalin tank to American ones should not think just in terms of comparative weights and powers—but of missions. The German Panther had the weight of the new Stalin, but it was a medium tank for armored force duties, while the Stalin was built for the missions implied in the Soviet definition of heavy tank. Moreover, the Stalins were and are part of a team—one which in Soviet divisions include heavy and medium tanks, heavy fire support self-propelled guns and tank destroyers.

As the Germans proved by their brilliant victories and their stupid failures, in war as in sport, it's the team that counts—and not the apparent stars.

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